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which I could ascertain how many of the professional botanists—those who have passed out from under our hands within the past ten or fifteen or twenty years, or longer—how many of these were young investigators before they went to the high school. I will venture to guess that I could pick out in this room fifteen or twenty of the men who sit right here whose youth I know something about, who made collections of plants and insects and hammered up rocks to get the fossil shells out of them before they went to the university or came within three or four years of it.

If statistics should bear out my belief, we should find that most scientists are so born and not given their bent by training, and that the few turned by training in the direction of professional science are thus influenced by the teacher who knows how to make the student an investigator at the same time he is pupil.

LEONARD P. KINNICUTT

IN the issue of *SCIENCE* of February 17 there appeared a brief notice of the death of Professor L. P. Kinnicutt, director of the department of chemistry in the Worcester Polytechnic Institute.

Leonard Parker Kinnicutt was born in Worcester, May 22, 1854, the son of Francis H. and Elizabeth Waldo (Parker) Kinnicutt. He received his early education in the schools of Worcester, graduating from the high school in 1871. He went at once to the Massachusetts Institute of Technology, where he devoted himself chiefly to the study of chemistry. Following his graduation, in 1875, with the degree of bachelor of science, he spent four years in professional studies in Germany. At Heidelberg he came under the inspiring influence of Bunsen from whom he acquired an appreciation of the value of careful and accurate analysis. Here also under Bunsen's guidance he was initiated into the refinements of gas analysis. This was the period when organic chemistry was developing with tre-

mendous rapidity especially in Germany. Bunsen had passed the zenith of his career and was not in sympathy with the new tendency which was manifesting itself in chemistry. It is not surprising then to find the young Kinnicutt leaving Heidelberg and matriculating at Bonn. Only ten years before, Kekulé had been called to the University of Bonn to take charge of the newly built laboratory, which at that time was the finest in all Germany and after which later laboratories were patterned. Kekulé's was a charming personality. His lectures were a model for simplicity of arrangement and clearness of presentation, and the experimental demonstrations were carried out with such fascinating ease and dexterity that the young Kinnicutt was captivated by the spirit and beauty of organic chemistry and devoted himself diligently to its study.

He was fortunate in being accepted into the private laboratory of the master, where he became associated with Richard Anschütz, the present director of the Chemical Institute at Bonn. In collaboration with Anschütz he published a number of papers, chiefly on phenyl-glyceric acid. This association ripened into a lasting friendship. Returning to the United States in 1879, he spent a year in study with Ira Remsen at the Johns Hopkins University, and then three years at Harvard, where he served as instructor in quantitative analysis and as private assistant to Wolcott Gibbs, at that time Rumford professor of chemistry. In 1882 he received from Harvard the degree of doctor of science and in September of the same year accepted an appointment as instructor of organic chemistry at the Worcester Polytechnic Institute. In the following January he became assistant professor of chemistry; three years later he was made full professor, and since 1892 has been director of the chemical department.

As early as 1885 Professor Kinnicutt began to give attention to the question of sewage disposal and sanitary problems. He became an authority on the sanitation of air, water and gas; on the methods of analysis and on the disposal of wastes. He paid particular atten-

tion to the examination of water and watersheds and the contamination of rivers and ponds by trade wastes and sewage. He made numerous reports, both as regards private and public water supplies.

He visited England on an average every other year since 1894, familiarizing himself with the work done in that country and the results were embodied in various articles which he published on the subject. He paid special attention to the subject of the pollution of streams by wool-washings, and made a careful study of this problem at Bradford, England, where a greater amount of wool is washed annually than in any other city in England or in this country.

He was employed as an expert in numerous cases regarding the pollution of streams and ponds, and was one of the experts in the case of the pollution of the Mississippi River at St. Louis by the sewage of Chicago. In 1903 he was appointed consulting chemist of the Connecticut Sewage Commission, a position which he retained up to the time of his death. He was a frequent contributor to scientific periodicals and the proceedings of learned societies upon topics relating to his specialty.

In 1910, in collaboration with Professor C. E. A. Winslow, of the Massachusetts Institute of Technology, and Mr. R. Winthrop Pratt, of the Ohio State Board of Health, he published a book entitled "Sewage Disposal" which is considered to be one of the best treatises on the subject of sewage disposal in the English language.

Professor Kinnicutt's reputation was not confined to this country. He enjoyed a wide acquaintance, both in England and on the continent, and possessed the rare faculty of keeping ever fresh and active a friendship once established. One of his highest honors was the appointment as president of the Section of Hygiene of the International Congress of Applied Chemistry, which is to be held in Washington and New York in September, 1912. Even to within a few days of his death he continued to work with characteristic zeal in perfecting plans for the success of the section over which he was to preside. Professor

Kinnicutt was deeply interested in the sanitary problems of his native city, Worcester. He kept a careful watch upon the city's water supply. During the "water famine" of the present winter, from his sick-bed he directed the tests to be made, had daily reports brought to him and outlined the policy by which, in his opinion, the city's health might be best safeguarded.

He devoted a great deal of time and money to secure a pure milk supply in summer for the babies in needy families, and at the time of his death he was a member of the Worcester Medical Milk Commission, which is investigating the question of pure milk for the city. Professor Kinnicutt was widely connected with scientific associations; he was a fellow of the American Academy of Arts and Sciences; a fellow of the American Association for the Advancement of Science, of which he was vice-president in 1904; a member of the American Chemical Society, and president of its Northeastern Section in 1902, and councillor for a succession of years; a member of the Society of Bacteriology; a fellow of the New England Water Works Association; of the Boston Society of Civil Engineers; of the American Antiquarian Society, and of various foreign associations, including the Association of Managers of Sewage Disposal Works of England, the London Chemical Society, and the German Chemical Society. He was a member of several social clubs in Worcester and Boston and retained to a remarkable degree his interest in the alumni reunions of the Massachusetts Institute of Technology, of the Johns Hopkins University and of Harvard University, and he rarely failed to be present and add his geniality to the general good cheer.

Esteemed and honored by the scientific world, and beloved by a wide circle of acquaintances, yet it was as a teacher that the true worth of his character manifested itself. Possessed of a broad training and knowledge of his subject, and a fund of personal experiences, with which he punctuated his lectures, he was enabled to drive home the truths which he desired to impress on the minds of his stu-

dents. Interest in his students, however, did not cease with the lecture or the laboratory. He was ever ready to listen sympathizingly and indulgently to those students who were in distress, and to all such he gave liberally of his time and purse. This conscientious devotion to duty and unselfish human interest endeared him to the students and alumni. It came as a great shock to all when, after a delightful summer of European travel and the resumption of his academic duties, apparently in his usual good health, he was attacked by a slow fever which confined him to the house after but a few days of activity. The trouble was diagnosed finally as tuberculosis. He received his first warning that he had this insidious disease in his system when he was a student in Germany, but had apparently fully recovered from this earlier attack. It was hoped that a year's leave of absence and careful nursing would restore him to health and the resumption of a part at least of his former activities. Toward the end of January, however, his heart became seriously affected, and he failed rapidly until the end came peacefully on the morning of the sixth of February.

Professor William T. Sedgwick, a lifelong friend and one of the pallbearers at his funeral, paid a fitting tribute to his memory when he said, "His was a unique, lovable and altogether charming personality. Kindness and friendship such as his life exemplified could no further go. He was critical, yet just; fearless yet considerate of others; honest to a fault; a hard worker; and to a degree nowadays unusual, an accomplished and cultivated gentleman."

W. L. JENNINGS

WORCESTER POLYTECHNIC INSTITUTE

HENRY PICKERING BOWDITCH

THE following memorial note on the life and services of Professor Henry P. Bowditch has been prepared for the American Physiological Society by a committee of its members:

At the death of Henry Pickering Bowditch there passed away a man who had notable influence on the development of medical and biological science in America. He was born

in Boston, April 4, 1840, and was graduated from Harvard College in 1861. As a graduate he began the study of chemistry in the Lawrence Scientific School, but left, in November, 1861, to become second lieutenant in the First Massachusetts Cavalry, then starting for the front. After loyal and chivalrous service to his country during the remaining three and a half years of the Civil War, he resumed his studies in Harvard University and received, in 1868, the degree of Doctor of Medicine. Thereupon he went to France and Germany to learn from the masters of his chosen science, physiology, the aims and methods of research. Filled with the spirit of Bernard and Ludwig, he returned to the Harvard Medical School in 1871, and established the first American physiological laboratory for the use of students, a laboratory which soon proved hospitable to investigators in every phase of experimental medicine. For thirty-five years he was an energetic and inspiring teacher, and a leader in investigation. His studies of the peculiar functions of cardiac muscle, the indefatigability of nerves, the knee-jerk and conditions affecting it, the force of ciliary activity, and the growth of children, illustrate the range and originality of his researches. Apparatus invented by him and widely used in physiological laboratories attest his mechanical ingenuity. He was one of the founders of the American Physiological Society and was its second president. The traditions of the society, particularly its character as an association to encourage research, are largely the result of his initiative. His example and his genuine appreciation of new work as it was reported at meetings of the society were a wholesome stimulus to young men beginning physiological investigation.

To the larger interests of medicine he rendered important service by promoting reforms in medical education, notably by advocating and helping to introduce the four years' required course, and later by strongly urging greater freedom of election in medical study. The Harvard Medical School he served as Dean for a decade of important growth, and the development of the school will long con-